



AMENDMENT TO THE DRAWINGS

Please enter the accompanying newly submitted substitute drawings into this application. The drawings are identical to those on file, except for the addition of reference number "44" and its lead line in Fig. 3, and the computer generation of all of the reference numbers and lead lines.

REMARKS

This RCP amendment responds to the Final Office Action dated 03/30/06, that rejected Claims 11-15 under 35 USC 103 and 112 matters. These Claims 11-15, and Claim 10 directed to the method of making the column, are being cancelled now.

Newly submitted Claims 16-19 have been totally rewritten to recite inventive subject matter neither disclosed nor suggested by the cited references of Schick, Higgins, Brown and/or Firth patents. Accordingly, these claims are believed patentable and the application is now believed in condition to be allowed.

More specifically, the new independent Claim 16 is directed to a HPLC column 10 ready to be connected and used in a serial flow circuit between capillary lines 48 having externally threaded end fittings 50 associated therewith. The recited column has an inner tube 12; absorbent 20 filling the inner tube; a filter assembly 24 across each inner tube end containing the absorbent; and end coupling members 16 outwardly adjacent the filter assemblies. A cylindrical outer tube 14 overlies all of the inner tube 12 and each filter assembly 24, and an inward portion of each coupling member 16, all being arranged in an axially aligned association. Means 72, 58, 60 cooperate between the outer tube 14 and the underlying inward portion of each end coupling member 16 for mechanically holding the outer tube and end coupling members together. Each end coupling 16 has an internally threaded opening 46 suited to cooperate with a respective threaded end fitting 50,

52, each filter assembly 16 has a sealing bore 38 sized to cooperate in liquid-tight association with a respective capillary line 48, and the opening and bore are concentrically arranged suited for mechanically connecting the end fittings and capillary lines in a liquid-tight flow connection through the column. Lastly, the outer tube 14 cylindrical outer surface defines the maximum outer radial dimension of the column 10.

As noted in the specification, having the cylindrical outer column surface define the maximum outer radial dimension of the column has many advantages including: (1) providing uniform diameter length for attaching a visually readable column identifying label, even for the shortest columns; (2) allowing the column to be positioned in highly effective thermal contact with most conventional heating/cooling apparatus used for maintaining uniform temperature control, should such be needed during a run; (3) making and assembling the column is possible economically, without costly or time consuming machining of threads for securing separate end cap components; and (4) the column appearance is clean, simple and of apparent high quality.

The Schick "column" is comprised of a "column subassembly" 30 and a "holder" 50 having coupling openings 54, and these components must be assembled together in order to allow capillary lines 60, 70 to be connected in the operative flow circuit. The rejection noted that outer tube 25 of the Schick subassembly 30 has ends conically deformed over the sealing members 34; but the subassembly itself

does not have any end coupling structure nor does Schick teach or suggest having the ends of tube 25 deformed over the holder 50 or any end couplings. Further, Schick neither teaches nor suggests having the outer tube cylindrical outer surface define the maximum outer radial dimension of the "column", as now provided in new Claim 16, as holder 50 clearly defines the maximum radial dimension of the "column" (see Fig. 1).

Higgins utilizes end coupling caps (22, 221) in tubular columns of different constructions and lengths: Figs. 1, 2 showing a regular length threaded outer tube 24 for holding two threaded end caps 21, 22 containing end coupling members 44; and Fig. 6 showing a short column having one end coupling 316 with external threads 316a suited to cooperate with threaded end cap 221 fitted over and containing the other end coupling member 244. The cap 221, cooperating over the end coupling 316 tube, defines the maximum outer radial dimension of the column, which is different from the claimed combination; and the stepped outer diameter of the Higgins column makes temperature control less responsive than the claimed HPLC column. Also, the separate threaded components of Higgins would have to be machined at considerable cost, and possibly increased inventory requirements.

Neither the Schick nor Higgins column is ready to use, but each must be combined with other structure (the holder 50 for Schick and the end couplings/caps for Higgins) for either to be

used. When so assembled, the outer tube does not establish the maximum radial column dimension.

The Firth and Brown disclosures are unrelated to the invention, showing only that one can sufficiently deform metal with a rolling crimping tool into an interference fit with adjacent structure, suited then for high pressure containment. However, the manner of forming this column is not specifically claimed, but if it were, it would be with a cap-like tool pressed against and over the outer tube end.

Without using the hindsight wisdom of applicants' own disclosure, it would not be obvious to use the Higgins arrangement with the Schick outer tube and come up with anything like the claimed HPLC column, as the Schick holder 50 serves the same function as the Higgins end coupling 216 and cooperating end cap 221 together. Moreover, the Higgins threaded end cap requires a hard outer tube construction having cooperating threads, and Schick, without the holder 50, has neither.

New Claim 16 is thus believed patentable over the previous rejections, and should be allowed.

New Claim 17 recites additional structures regarding the means for holding the outer tube and the each end coupling member together, specifically including each end coupling member having an annular groove for receiving the outer tube, configured conically to tightly fit therein.

New Claim 18 depends from Claim 17 and provides that said groove has depth and width relationships relative to the wall thickness of the outer tube, suited to have the outer tube end substantially hidden within the groove.

New Claim 19 depends from Claim 18 and provides for additional size and structural relationships of inward and outward radial groove surfaces relative to the outer tube.

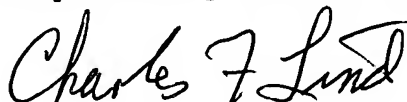
As these recited additional structural limitations are neither disclosed nor suggested in the references, new dependent claims 17, 18 and 19 should also be allowed.

New drawings are being submitted, identical to those now on file except for having formalized computer numbers thereon, and the inclusion of the number "44" in Fig. 3, which was inadvertently missing from the original.

The undersigned is also submitting a Declaration Traversing the Rejection under 37 CFR 1.132, from co-inventor Yury Zelechonok. This Declaration establishes that the invention has been highly accepted by the liquid chromatography users, because of its significant and unexpected technical advances in the field.

Favorable consideration of the newly submitted claims is believed in order, and a Notice of Allowance is requested.

Respectfully submitted,



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